THE UNIVERSITY OF WARWICK

June 2010 No.5

UNEVEN GROWTH: A FRAMEWORK FOR RESEARCH IN DEVELOPMENT ECONOMICS

Prof Debraj Ray (NYU)

WORKING PAPER SERIES

Centre for Competitive Advantage in the Global Economy

Department of Economics

CAGE Competitive Advantage in the Global Economy

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

UNEVEN GROWTH: A FRAMEWORK FOR RESEARCH IN DEVELOPMENT ECONOMICS

Prof Debraj Ray (NYU)

June 2010

Abstract

The textbook paradigm of economy-wide development rests on the premise of "balanced growth"; that is, on the presumption that all sectors will grow in unison over time as a country gets richer. This view has served us reasonably well in some circumstances, but is not particularly useful for accounts of modern (under)development.

In many developing countries, economic growth has been fundamentally uneven: software development, the outsourcing of services, sectoral technological change, quick compositional shifts between agriculture and other sectors, the rise of particular exports, "special" economic zones, and so on. This paper will discuss both the sources of uneven growth, and its implications, with greater emphasis on the latter.

The paper will argue that much of the distributional issues, or the reactions to globalization that we see in modern developing societies can be viewed as reactions to a growth process that is fundamentally uneven and is indeed perceived as such.

Keywords: Balanced growth; Economic Development; Globalization

JEL Classification: 0, 10, 040, 014

UNEVEN GROWTH: A FRAMEWORK FOR RESEARCH IN DEVELOPMENT ECONOMICS

DEBRAJ RAY

The textbook paradigm of economy-wide development rests on the premise of "balanced growth"; that is, on the presumption that all sectors will grow in unison over time as a country gets richer. This view has served us reasonably well in several circumstances, particularly those pertaining to macroeconomic models of long-term growth. An implicit view that growth is balanced across sectors, or something close to it, also underlies the notion of "trickle-down", a stance that has strongly influenced development policy.

Of course, we would all agree that balanced growth is an abstraction. In many developing countries, economic growth has been fundamentally uneven. First one sector, then another, then a third have grown rapidly, *but not all together*. A list of some instances of this phenomenon would include: software development, the outsourcing of services, quick compositional shifts between agriculture and other sectors, the rise of export processing zones, and others. The question really is not whether growth is balanced — it isn't — but whether the abstraction is a useful one. For many important development questions, I believe the answer is no. This is why I would like to take the reality of "uneven growth" seriously, and use it as an organizing device for a research program.

I divide my research agenda into roughly two parts: the *sources and nature* of uneven growth, and the *reactions* to uneven growth. The first part studies the ways in which uneven growth might arise, and its implications for economic inequality. The second part studies reactions: how forces are set in motion to restore balancedness or perhaps even slow down or thwart the growth process. To many, the former may appear unimportant without an appreciation for the latter, so let me state at the outset that the second part is the more important section of the paper, and the impatient reader is free to turn to it right away. But a few introductory remarks may help as well.

In thinking about the effects of uneven growth, Albert Hirschman's tunnel parable is useful (see Hirschman and Rothschild (1973)). I present a slightly altered version. You're in a multilane tunnel, all lanes in the same direction, and you're

---

Date: June 7, 2010.

Ray is Julius Silver Professor of Economics, New York University, 19 West 4th Street, New York, NY 10012; email debraj.ray@nyu.edu. This paper was written while I was a Fulbright-Nehru Research Fellow at the Indian Statistical Institute, New Delhi. I am grateful to both the Fulbright Foundation for their support and the Indian Statistical Institute for their warm hospitality. I thank David Autor, Maitreesh Ghatak, Chad Jones, Ashok Kotwal, Julia Schwenkenberg, Rohini Somanathan and Timothy Taylor for many useful comments and expository suggestions. A version of this article will be published by the *Journal of Economic Perspectives* in their Summer 2010 issue. This paper forms a base for a keynote talk that I gave at the inauguration of CAGE, a Research Centre at the University of Warwick studying Competitive Advantage in the Global Economy.

caught in a serious traffic jam. After a while, the cars in the other lane begin to move. Do you feel better or worse? At first, movement in the other lane may seem like a good sign: you hope that your turn to move will come soon, and indeed that might happen. You might contemplate an orderly move into the moving lane, looking for suitable gaps in the traffic. However, if the other lane keeps whizzing by, with no gaps to enter and with no changes on your lane, your reactions may well become quite negative. Unevenness *without corresponding redistribution* can be tolerated or even welcomed if it raises expectations everywhere, but it will be tolerated for only so long. Thus, uneven growth will set forces in motion to restore a greater degree of balance, even (in some cases) actions that may thwart the growth process itself.

We could ignore this central issue. One reaction might be that we do not care about distribution as long as the aggregates work right. Or perhaps some form of Coasian or welfarist "compensation principle" is believed to be at work. Either reaction assumes away or simply negates a crucial set of development problems, revolving around the political economy of intersectoral or inter-group allocation.

The Hirschman parable also contains a parallel implication to which even less attention has been paid. The movement of "neighboring lanes" under uneven growth not only brings us information about what is possible, but it also defines and moulds our *aspirations* for the future. Economists, mired as they generally are in a context-less description of human preferences, are nowhere close to a theory of socially defined aspirations and for the double-edged way in which they might influence individual behavior — either constructively, via a profitable chain of investment and reward, or destructively, via frustration and violent conflict.

Considerations such as these serve as entry points into some fundamental development questions. Methodologically, they also underscore the need to look beyond traditional models, by explicitly incorporating the social basis of individual preferences and well-being, or by calling for better models of nonmarket allocations, such as those achieved through lobbying and conflict.

As for the first part of this paper, on the sources of uneven growth, I have more precedent to lean upon. Some of the earliest development models emphasized the varying roles of different sectors of the economy. Rosenstein-Rodan's (1943) view of underdevelopment hinged on a failure of coordination across a variety of interlocking economic sectors. Hirschman (1958) emphasized the concept of "leading sectors" that — by virtue of their strong linkages to many other sectors — would pull the rest of the economy through the development path. Nurkse (1953) and Lewis (1954) noted how agriculture might serve as a near-inexhaustible supply of labor that might fuel industrial development without a drop in per-capita food output. Rao (1952) and Ranis and Fei (1961) took these ideas further by explicitly discussing a two-sector model that combined the working of a surplus-labor agricultural sector with a demand-driven industrial sector. In some ways, my proposed framework merely draws on a part of this earlier literature and marries it to modern renditions of the aggregate growth model.

Our consideration of uneven growth leads to all sorts of questions that, in some ways, bridge the gap between the micro and the macro of development. It also highlights a number of ongoing issues in development economics in a unified way: notions of the dual economy and the possibilities of trickle-down, theories of occupational choice, history-dependence, the political economy of intersectoral allocation,

socially determined aspirations, violent conflict and the question of appropriate redistribution and compensation in the process of development.

1. The Sources of Uneven Growth

Think of an economy populated by a large number of sectors, some final and some intermediate. Each sector calls upon physical capital and various sorts of human capital to produce output. As a starting point, imagine that all preferences and production change smoothly and in the same proportions. Suppose further that there are no supply bottlenecks, and that public resources are allocated evenly across all parts of the economy. In this hypothetical economy, sectoral growth will simply track aggregate change in a balanced way. In reality, these assumptions make little sense. Indeed, they miss out several problems of fundamental interest. I begin by considering just why growth comes in uneven, sector-specific jumps rather than in an even, well-diversified spray.

1.1. **The Composition of Demand.**

The textbook assumption of microeconomic theory is that an individual's *relative* demand for different products is unaffected by her income. This property is referred to as *homotheticity*. With homothetic demand, an increase in income is always matched by a equiproportionate rise in the quantity demanded for every good.

Of course, demand isn't homothetic in reality, and everyone knows it. As consumers, we start off with the basics — food, clothing and shelter — and as our income grows, other needs are met with other goods. As producers, we might shift to more methods that are more intensive in technology or capital, as scale increases. The question is whether we can get away with the homotheticity assumption as a simplifying device. Not surprisingly, the answer depends on what we are interested in. For some macroeconomic questions, such as the long-run rate of growth,[1] the simplification may be a good one. For others, e.g., questions of distribution across sectors or individuals, the assumption can be way off the mark.

Food is perhaps the most dramatic example of long-run uneven development, one that necessitates basic structural change in the workforce, and in resource use.[2] The majority of India's population lives and works in the rural sector. In the United States and in other developed economies the corresponding percentage of the population is close to zero, and in the corresponding Latin American percentages we see where India is surely headed over the next decade or so. This transition is a fundamental source of unevenness which informs much political and economic debate in many developing countries. While there are attempts to integrate such nonhomotheticities into theories of distribution and trade,[3] there is to my knowledge little or no literature that ties these matters into the political economy of development. I will return to this issue below.

---

[1] More generally, an assessment of the so-called "Kaldor facts" — the long-run constancy of growth rate, the capital-output ratio, the real interest rate and so on — may not require much more than the one-sector growth model.

[2] Clark (1940) and Kuznets (1957) emphasized such structural change as fundamental aspects of the development process. For models that address such aspects while attempting to retain conformity with the Kaldor facts, see, e.g., Caselli and Coleman (2001), Kongsamut, Rebelo and Xie (2001) and Gollins, Parente and Rogerson (2007).

[3] See, for instance, Markusen (1986), Baland and Ray (1991), Mani (2001), Matsuyama (2000, 2002), Foellmi and Zweimuller (2006) and Fieler (2010).

To be sure, the general point goes beyond structural transformation from agriculture to industry. The compositional pattern of demand — and its alteration as income grows — is important whenever substantial costs must be incurred (including the cost of migration and relocation, not to mention training) to transfer factors of production one sector to another. Agriculture and industry fit the bill, but so do, say, coal-mining and software.

The combination of nonhomothetic demand and costly transfer of human inputs can reinforce or counteract each other. Perhaps the ultimate expression of reinforcement is the *dual economy*. (The concept goes back at least to Nurkse (1953) and Lewis (1954).) A dual economy is divided into near-independent enclaves. In the simplest version, a subsistence sector produces basic consumption goods, and those employed in such sectors consume these basics, with little left over for anything else. Side by side, a rich, sophisticated subeconomy produces a variety of goods and services, largely for those employed in that latter subeconomy. The two subeconomies coexist, but not necessarily in a symbiotic way. If the high-tech subeconomy undergoes a boom, there are few connections for that boom to transmit itself elsewhere. Trickle-down won't work well in the dual economy.

Like all abstract concepts, the simplest version of the dual economy is a caricature. After all, the rich do consume basics, and the poor are often employed in production of goods or services consumed by those with higher incomes. But such intersectoral connections may be *relatively* sparse. For that to be the case, the nonhomotheticity in demand must be of a particular kind: by and large, *the rich must consume things that the rich produce*. Both the direct and indirect demands (via the input-output matrix) of the rich must be intensive in factors of production that the rich themselves supply — and a parallel observation must be true of the poor.

Is this "segregation" something that we empirically observe? The question is of immense importance in evaluating growth-based development processes that rely on trickle-down. The dual economy relies on a particular sort of nonhomotheticity in direct and in derived demand. We need empirically implementable metrics of the extent of "segregation", that measure the degree to which the dual-economy idea is true.

1.2. **Uneven Growth and Inequality.** The dual economy is a particularly dramatic manifestation of unequal development. More generally, there are varying degrees of segmentation rather than full segregation. This leads to the broader question of whether and how uneven growth generates persistent inequalities, rather than trickle-down and convergence.

There are several theories of the relationship between growth and inequality. For example, in one approach based on aggregate growth models with diminishing returns to factors (in the tradition of Solow (1957)), persistent inequality is entirely a matter of ongoing stochastic shocks. Barring "luck", these theories would predict no long-run inequality at all. Example of this approach are Becker and Tomes (1979, 1986) and Loury (1981). A second approach emphasizes presence of fixed costs in investment can generate steady state traps, in which poverty breeds poverty (for example, Majumdar and Mitra (1982) and Galor and Zeira (1993)). A third approach emphasizes occupational choice, a point to which I will return in a later section.

The framework outlined in the previous section leads to a different, entirely complementary, and equally significant view on persistent inequality. Growth leads to a change in the commodity mix, which will then be translated into a change in the demand for factors. Will this process be equalizing for incomes? Yes, if the original beneficiaries of the process generate demands for factors held by individuals that did *not* originally benefit, setting in motion a self-correcting change in the distribution of income and wealth. If, on the other hand, the beneficiaries generate a demand mix that translate into demands for factors held by those very same beneficiaries, the system must spiral away from equality. Our description of the dual economy can now be viewed as a "steady state", while the model of evolving inequality sketched here represents an accompanying dynamic.

A proper empirical investigation of these conditions will require us to specify demand systems that allow for compositional change (with income growth), and to estimate input-output matrices that summarize different factor demands for different sectors.

Many of the central questions of development economics fall within this intuitive framework. Issues of equitable and broad-based growth, the role of the market, the nature and scope of government intervention: these can all be better studied with the basic model I have just described.

1.3. **Globalization and Inequality.** The uneven growth framework is particularly useful for thinking about globalization and its effects. It is a fairly general proposition that increased openness heightens unevenness in production at the country level. After all, production in sectors with a comparative advantage will grow faster as the economy opens to international trade.

The effect of globalization on inequality is complex. There are low-income countries for which an opening to trade will have textbook implications, such as the export of products that are intensive in unskilled labor. There are middle-income developing countries with an substantial supply of human capital for which the opposite is true: these will export goods with a significant component of technical knowhow and skill. Both sets of countries will, of course, exhibit factor-price equalization for factors active in the traded goods. But in the former set, inequality will fall, while in the latter, inequality will rise. Indeed, if unskilled labor is largely devoted to non-traded goods or services, the rise in inequality will be large and noticeable. Globalization-induced uneven growth of this variety could well be a serious concern.

A second layer of effects concerns *cross*-country inequality. Suppose that country-level infrastructure is suitable for either high-tech or low-tech production, but not both. If both high-tech and low-tech are important in world production and consumption, then *some* country has to focus on low-tech and *another* on high-tech. Initial history will constrain such choices, if for no reason than the fact that existing infrastructure (and national wealth) determines the selection of future infrastructure. Over time, as the whole world climbs up the income scale, the compositional change in demand will make for a greater proportion of high-tech, and more and more countries will be able to make the transition. But on the whole, if national infrastructure is more or less conducive to some (but not the full) range of goods, there will be adverse distributional effects in the world economy as well.

This sort of model raises obvious questions. What is so specific about "national infrastructure"? Why is it not possible for every country to produces the same or

similar mix of goods, thus guaranteeing convergence? Do current national advantages somehow manifest themselves in future advantages as well, thus ensuring that the world economy settles into a permanent state of global inequality? As frameworks go, this is not a bad one to start thinking about the effects of globalization.

As I have discussed in more detail in Ray (2007), it is possible to enrich this discussion by bringing in the role of how early institutions set patterns for long-term growth (as in Engerman and Sokoloff (1997), Sokoloff and Engerman (2000) and Acemoglu, Johnson and Robinson (2001)). A specific colonial or institutional history will act as a constraint on — or might mould — national infrastructure, driving the country into a particular production slot in the global economy.

Our view of uneven growth fits in well with the entire debate on globalization. One side of this debate emphasizes the convergence aspects: outsourcing, the establishment of international production standards, technology transfer, political accountability, and the spread of responsible macroeconomic policies. The persistent-inequality counterarguments emphasize how a skewed playing field can only keep tipping. Nonconvexities and increasing returns are endemic in this view. It is time to frame the globalization disputes within a theoretical framework that allows for uneven growth, across sectors and across countries.

2. Reactions to Uneven Growth

If each sector were an island, uneven growth across them would not matter, at least to those uninterested in inequality *per se*. But of course, there are many connections across sectors. Organizing our thoughts along Hirschman's parable, uneven growth initially provides hope, in several ways. First, those who find themselves in a non-growth sector might be able to participate in the sectors that are growing by changing the sort of human capital they have, or — more realistically — changing the human capital their children will bring to the labor market. This is the route of *occupational choice*. Second, the growing sectors might trickle down — or over — and stimulate incomes in other sectors; this is the *demand channel*. Third, government might use various supports, subsidies, salary adjustments, and protections, to twist the river of economic progress through different territories. This is the avenue of *political economy*, at least of the relatively peaceful kind. But there is also the possibility of frustration: if uneven growth is perceived as persistent and exclusionary, society may enter a different and darker realm: the possibility of development being scrapped or thwarted, often by violent means; this is the area of *conflict*.

2.1. **Occupational Choice.**

Consider information-technology-based services in a developing country such as Argentina or India: call centers, diagnostic services, legal services, accounting and record-keeping, and so on. Initially, the process sets up a sizable demand for those trained in the English language, as well as in computer literacy, basic business and communication skills, and with some legal or medical training. The boom attracts attention and raises sectoral incomes. How might this boom percolate to the rest of the country?

The first line of argument is occupational choice. In the context of our example, English-medium education in India is going through a tremendous upsurge (see, e.g.,

Munshi and Rosenzweig (2006)). Moreover, technical institutes are everywhere, vocational centers are widespread and private business schools are commanding unprecedented prices. The upsurge is even evident at primary and secondary schooling levels.

At some point, schooling will affect the composition of the work force, and in this way a concentrated boom can spread. But there are limitations to what occupational choice can achieve, and understanding these limitations and assessing their overall scope constitutes a fertile research area.

First, changes in occupational structure can take a generation or more to implement. To be sure, adults can sometimes retrain to match newly demanded skills, but this is typically more the exception than the rule. This time lag means that there is substantial uncertainty in sector-specific occupational choices. A student may train for an information-technology job, but find that the economic pendulum has swung in a different direction — from software and services to chipmaking or bioengineering, for instance — which requires a different set of skills. In a rapidly changing world, the pursuit of generalized education may be worthwhile, but of course generalized education has its limits in any particular field.

Second, and despite the time scales involved in occupational choice, it is often assumed that parents will indirectly benefit, because they internalize the welfare of their children, or perhaps because their children will look after them in old age. Such altruism indeed exists (both ways), but it *cannot* serve as unqualified consolation for those whose boats will never be lifted by the prosperity tide.

Finally, and perhaps the most-studied of these three points, there are the fundamental difficulties of efficient occupational choice when capital markets are missing or imperfect (for example, Banerjee and Newman (1993), Galor and Zeira (1993), Ljungqvist (1993), Ghatak and Jiang (2002) and Mookherjee and Ray (2003)). This literature emphasizes the history-dependence of the development process: an economy with high initial inequalities could be trapped, unable to make the efficient sectoral choices and therefore losing out at the aggregate level. While this literature does not emphasize uneven growth, it is easy enough to see the beginnings of a line of research that combines capital-constrained occupational choice models with sectoral growth.

2.2. **Demand as a Channel for Spreading Income.** A second avenue of percolation is cross-sectoral demand. Suppose that there are only two kinds of agents in our previous example: information technology service providers and potato growers, and that information technology services is in the throes of a boom. How can the potato grower benefit from the information technology boom? An obvious answer is that the service providers will spend more on potatoes, leading to more income in the hands of an individual potato grower.

We've already discussed some potential strengths and limitations of this effect (recall the discussion on nonhomothetic preferences and trickle-down), but I now want to stress a different point. Unless the supply of potatoes is completely elastic, the relative price of potatoes *must* rise with the increase in demand. From a macroeconomic perspective — and particularly when absolute prices in the boom sectors are sticky downwards — such relative price "corrections" will generally cause some inflation. Ceteris paribus, an uneven-growth economy must be more inflation-prone than a balanced-growth economy. In economies where the boom takes place

in the export sectors, this concern is multiplied, if there is interest in keeping the domestic currency inexpensive to generate international competitiveness.

From a macroeconomic perspective, the connections between international currency management and domestic monetary policy are well-appreciated. From a perspective that emphasizes uneven growth across sectors, there is more to learn. A particularly strict stand on domestic inflation could hinder adequate relative price adjustments, and therefore the percolation process. Inflation targeting in an unevenly growing economy is a delicate business, and macroeconomists — with their focus on the aggregative model — have too little theory with which to educate the central banker.

2.3. **The Political Economy of Uneven Growth.** Deliberate government policy can generate comparative advantage in certain sectors, or at the very least it can help a boom sector along once it starts. But which sectors are to be nurtured in this way, and which sectors are to be abandoned, say, to existing foreign suppliers? Through most of the developing world these questions are a subject of constant debate.

A key starting point is that government support *cannot be provided to every activity at once*. Resources are limited, whether allocated to infrastructure, tax breaks, subsidies on the use of electricity or fertilizer, or other forms. The allocation of public resources will ultimately depend on debate, discourse and lobbying. At any one point of time, a small subset of economic activities — perhaps "chosen" in an entirely random way — appear to be focal, and the attention and energies of the country are drawn to it. Such is the case with outsourced business in India from the United States and Europe: it accounts for a small fraction of Indian employment, out of proportion to the attention and media interest it generates.

Yet the power to influence the media and the government depends on two things. The first factor is the economic gain to be had from that influence. To the extent that sectoral rankings in economic gain are correlated with their relative *social* values— a claim that will not always hold true! — lobbying conveys useful information that can be used in efficient resource allocation (for example, Austen-Smith (1994) and Austen-Smith and Banks (2002)). The second factor is the wealth of potential lobbyists. While profitable sectors have more of an incentive to lobby, sectors dominated by wealthy interest groups find it *seasier* to lobby. Consequently, policymakers on the receiving end of such lobbies — even if they are honest — can make bad resource-allocation decisions. Indeed, relative to this scenario, corruption among policymakers may not make things that much worse (Esteban and Ray (2006)).

Indeed, uneven growth and the political economy of sectoral allocation together describe the channel through which "reversals of fortune" in the sense of Acemoglu, Johnson and Robinson (2002) might work. A country may have built up past wealth in certain sectors. The interests in those sectors will become politically entrenched, and will resist change to new sectors. The implicit argument here typically invokes corruption, but the argument is broader than that: if information about newly profitable sectors is not common knowledge, even a well-meaning government can succumb to entrenched interests, leading to a reversal of fortune in high-inequality countries.

A large fraction of the everyday political economy of developing countries relates to one of the most ubiquitous instances of uneven growth: specifically, the decline

of agriculture as a dominant livelihood for the majority, and the accompanying rise of industry and services. The political economy issues here include agricultural subsidies, attitudes to globalization, agrarian land rights, urban property rights, compensation related to dam placement, the transfer of land from agrarian to commercial use, such as industry and cash crops. Much recent research in development economics emphasizes these issues (for example, Besley (1995), Binswanger, Deininger and Feder (1995), Stiglitz (2002), Goldstein and Udry (2008), Duflo and Pande (2007), Field (2007) and Wang (2008)).

Two recent examples concern the proposed acquisition of land in Singur and Nandigram (in West Bengal, India), the former to set up a car manufacturing plant for Tata, the latter to set up a mega-chemical hub (one of hundreds of "Special Economic Zones" proposed all around India). The proposed acquisitions amounted to less then 1 percent of overall arable land in West Bengal. Yet political conflict over this move has been considerable. Intense protests and agitations over the issue of land acquisition have resulted in violence and loss of lives. Tata has since packed up and left, and the Nandigram plans have been shelved. Other companies have sought greener pastures elsewhere in India.

The Singur-Nandigram examples raise issues that are relevant to structural transformation in many developing countries. When trickle-down is minimal, or perceived to be so, the question of how to compensate those who lose during economic transitions is of vital importance. Property rights form a central aspect of this problem. As one instance, one might think of well-defined, identifiable losers — say, a situation in which all land is farmed by landowners and all factors of production are paid their opportunity cost. Then the owner reaps all the residual surplus and his consent to sell should generally line up with social efficiency. As another instance — typified by West Bengal — other agents have use rights to the asset (sharecroppers in the case of land), and will also claim part of the surplus. In this setting, official owners will be happy to sell land at a fraction of its true social value, because much of that value has "leaked" to the individuals with use rights. It is inefficient, then, to leave selling decisions to the owners alone.[4]

This argument can be extended to any activity in which non-owner agents receive a surplus over and above the outside options for that agent. Efficient shutdown of that activity will need the consent of those agents.

Next, the form of compensation deserves consideration. An excessive emphasis on one-off compensation exposes recipients to a risk that unexpected high inflation may erode their payments. Alternative proposals include compensation in the form of an inflation-adjusted monthly pension combined with a savings bond that can be sold (so that people have access to the equity value if a distress sale is required), payments linked to the future value of transferred land, or even shares in the new companies.[5]

The final point concerns credibility; in particular, the setting-up of a structure to ensure that promised payments are actually made. The history of credible compensation in India is problematic, to say the least. There is room here for serious, applied exercises in mechanism design. The study of compensation and transfers

[4]Ghatak and Mookherjee (2009) address this question with a somewhat different emphasis, focusing on *ex ante* investment incentives by landlord and tenant.

[5]For more discussion of this in the case of West Bengal, see Banerjee *et al.* (2007).

in the face of uneven growth is one of the most important research areas in development economics.

2.4. **Conflict.** The issue of social conflict in the process of economic development has only recently begin to receive attention from economists: for example, see the comprehensive survey by Blattman and Miguel (2009). In principle, one might include all sorts of social unrest under this rubric, ranging from peaceful demonstrations, processions and strikes to violent riots and even civil war. In practice, data limitations have restricted study to violent incidents, such as civil war, guerilla attacks and riots.

The linkages between economic growth and conflict are obviously complex. One connection is between overall growth (or income levels) and conflict. Collier and Hoeffler (1998, 2004) and Fearon and Laitin (2003) conducted cross-section studies of civil war across a large sample of countries. They present correlations showing that per-capita income is negatively related to conflict. In a study aimed at exploring causal linkages, Miguel, Satyanath and Sergenti (2004) use annual rainfall shocks as an instrument for economic growth, and support the findings in sub-Saharan Africa: negative growth shocks appear to raise conflict.

But overall growth is made up of two kinds of changes: one that creates a larger pot to fight over — and therefore raises conflict — and another that raises the opportunity cost to fighting, and so lowers it. Whether conflict is positively or negatively related to growth will therefore depend on the *type* of growth; specifically, how uneven it is across sectors or groups. Cross-country studies are too blunt to pick these effects up in any detail, though again Collier and Hoeffler (1998, 2004) and Fearon and Laitin (2003) led the way with cross-section studies that connect civil war to the abundance of natural resources. Dube and Vargas (2009) study civil conflict in Colombia, and obtain more nuanced results: positive shocks to resources such as oil, the funds from which accrue directly to governments, increase the payoff from conflict and thereby increases measured violence. On the other hand, positive shocks to resources such as coffee, which are grown privately, increase the opportunity cost of engaging conflict: violence declines.

Complicating the task of drawing connections from growth to conflict is the fact that many conflicts appear to be largely ethnic, geographical, and religious in nature, while outright economic class struggle is relatively rare. Horowitz (1985), a leading researcher in the area of conflict, observed that "in much of Asia and Africa, it is only modest hyperbole to assert that the Marxian prophecy has had an ethnic fulfillment." Indeed, using measures developed in my previous work with Joan Esteban (Esteban and Ray (1994)), Montalvo and Reynal-Querol (2005) have observed that ethnic and religious polarization is significantly and positively related to conflict. Recent models of ethnic conflict include Caselli and Coleman (2006), Esteban and Ray (2008, 2009) and Robinson (2001).

There is no contradiction between the use of noneconomic markers in conflict and the view that conflict may be driven by economic forces. Noneconomic divisions can be and frequently are used to obtain economic or political gains by violent means, often through exclusion. Nothing dictates that the groups must be *economically* distinct. Indeed, one might argue the contrary: if two groups are very similar economically, it is more likely that they will intrude on each other's turf: the motives for exclusion and resource-grabbing — and therefore for violence — may be even higher.

One classic example of a noneconomic marker is religion, as epitomized by the recurrent episodes of Hindu-Muslim violence in India. In recent research with Anirban Mitra, we explore the possibility that growth in the incomes of one religious group might spur conflict, as the other group finds itself threatened and attempts to nullify that growth. The econometric analysis we conduct is eminently supportive of this hypothesis. It is also complemented by several case studies that suggest that one religious group may react to the economic success of another group by excluding that group through conflict (see Mitra and Ray, 2010, and the references therein).

This sort of research raises further questions. Which kinds of economic growth reduce conflict, and which kinds exacerbate it? What is the relationship between inequality and conflict? How is class conflict related to ethnic conflict, and how can we separate the roles played by economic incentives and by long-standing distrust and hostility? These empirical and theoretical questions go well beyond the narrow confines of economics. For our present purposes, the bottom line is that while long-term, sustained growth should finally tame conflict, there is every possibility that medium-term uneven growth, among groups or sectors, could inflame it.

3. Uneven Development: Final Remarks

I end this essay with two broad remarks that pertain to uneven growth and its implications. The first has to do with institutions. The second has to do with psychological responses to economic change, particularly to uneven growth.

Of course, institutional success and failure are at the heart of the issues discussed here. After all, institutions are the structures that safeguard or hinder property rights, compensation mechanisms, legal structures, political participation, land reform, fiscal structure and a whole lot besides. But "institutions" is perhaps too broad a term — and too glibly invoked — to be particularly useful. It may be more productive, instead, to think of the political and economic agents that have control over various aspects of institutional creation and implementation.

Sokoloff and Engerman (2000) and following them, Acemoglu, Johnson and Robinson (2002) and others have emphasized situations of stagnation in which the losers (or potential losers) control institutions. Losers defend an old system — likely one born under a colonial umbrella — and so impede progress. But in the developing world of rapid and uneven growth, it is entirely possible as well that the *winners* are the ones granted institutional control. This can be deeply problematic as well, for unless their horizons are long enough to encompass the possibility that they, too, could be losers in succeeding rounds, they will block all redistributions that spread the growth process to other sectors. The reaction to such lack of compensation is, often, violent conflict. It will be of great importance to build a useful taxonomy of institutional performance (and reactions to such performance) depending on who has control.

I end this article with a remark on psychological reactions to economic change. The fact that uneven growth can both raise our ambitions, and unleash our frustrations, should be fundamental to our understanding of economic development. The aspirations of an individual are typically generated and conditioned by the experiences of others in that individual's "cognitive neighborhood". Such conditioning will affect a plethora of socio-economic outcomes: the rate of savings, the decision to migrate, fertility choices, technology adoption, the adherence to norms,

the choice of ethnic or religious identity, the work ethic, the strength of mutual insurance motives, or the collective decision to engage in conflict. Yet the models that economists write down and apply are blissfully devoid of such social influences on behavior.

The great bulk of individuals living in developing countries are constantly exposed to economic standards that comprehensively exceed their own. This is true, not just of the poor, but also of the middle class and the rich. After all, developing countries exist in a global context in which the wealth of the first world is constantly on display. It is unclear whether this constant exposure to higher living standards is conducive to a greater commitment to productive economic betterment, or to despair and frustration (Ray (1998, Sections 3.3.2 and 7.2.4), Ray (2006), Genicot and Ray (2009)).[6] A small, "reachable" economic gap may encourage investments and effort, while a large and persistent gap may stifle it. The raising of aspirations is a two-edged sword. There is scope for a self-sustaining failure of aspirations and economic outcomes, just as there is for ever-progressive growth in them.

A research agenda in development economics should not ignore this component of human behavior. In particular, economists should: 1) build databases from questionnaires that include socially determinants of behavior, such as aspirations, in ways that allow separating the informational effect from the hope and desire effect; 2) conduct more research on inequality tolerance and evolution; 3) study redistributive policy with these ideas in mind: not necessarily from a normative perspective,[7] but from a positive political-economy perspective.

I write this while on sabbatical in India: a desperately poor country that nevertheless has an active nuclear program and has sent an unmanned probe to the moon. Just as individual aspirations drive the dynamics of accumulation *within* countries, there is a role, too, for national aspirations, driven by inter-country disparities in consumption and wealth, and the effect of such aspirations on public policy as well as the international distribution of income. Even the simplest growth model that exhibits the usual features of convexity in its technology and budget constraints could give rise in the end to a world distribution that is bipolar. For instance, countries in the middle of that distribution would tend to accumulate faster, be more dynamic and take more risks as they see the possibility of full catch-up within a generation or less. One might expect the greatest degree of "country mobility" in this range. In contrast, societies that are far away from the economic frontier may see economic growth — exponential or otherwise — as too limited and too long-term an instrument, leading to a failure, as it were, of "international aspirations". Groups within these societies may well resort to other methods of potential economic gain, such as rent-seeking or conflict.

References

Acemoglu, D., Robinson J. and S. Johnson (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review* **91**, 1369–1401.

[6]These remarks are also related to Duflo's (2006) hypothesis that "being poor almost certainly affects the way people think and decide".

[7]Indeed, once we open the door to socially determined preferences, normative economics suffers a setback. That is not to say that welfare economics is impossible in this context, but several aspects of it need to be looked at afresh. I do not emphasize this important research area here.

Acemoglu, D., Robinson J. and S. Johnson (2002), "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution, *Quarterly Journal of Economics* **118**, 1231–1294.

Austen-Smith, D. (1994), "Strategic Transmission of Costly Information," *Econometrica* **62**, 955–963.

Austen-Smith, D. and J. Banks (2002), "Costly Signalling and Cheap Talk in Models of Political Influence," *European Journal of Political Economy* **18**, 263–280.

Baland, J-M. and D. Ray (1991), "Why Does Asset Inequality Affect Unemployment? A Study of the Demand Composition Problem," *Journal of Development Economics* **35**, 69–92.

Banerjee, A., Bardhan, P., Basu, K., Datta-Chaudhuri, M., Ghatak, M., Guha, A., Majumdar, M., Mookherjee, D. and D. Ray (2007), "Beyond Nandigram: Industrialization in West Bengal," *Economic and Political Weekly of India*, April 28.

Banerjee, A. and E. Duflo (2007), "The Economic Lives of the Poor," *Journal of Economic Perspectives* **21**, 141-167.

Banerjee, A. and A. Newman (1993), "Occupational Choice and the Process of Development," *Journal of Political Economy* **101**, 274–298.

Bardhan, P. and C. Udry (1999), *Development Microeconomics*, New York: Oxford University Press.

Barro, R. (1991), "Economic Growth in a Cross-Section of Countries," *Quarterly Journal of Economics* **106**, 407–444.

Becker G. and Tomes, N. (1979), "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility," *Journal of Political Economy* **87**, 1153–1189.

Becker G. and N. Tomes (1986), "Human Capital and the Rise and Fall of Families," *Journal of Labor Economics* **4**, S1–S39.

Besley, T. (1995), "Property Rights and Investment Incentives: Theory and Evidence from Ghana," *Journal of Political Economy* **103**, 903–937.

Binswanger, H., Deininger, K. and G. Feder (1995), "Power, Distortions, Revolt and Reform in Agricultural Land Relations," In *Handbook of Development Economics*, Vol. 3B (eds. J. Behrman and T. Srinivasan), Amsterdam: Elsevier Science, North Holland.

Blattman, C. and E. Miguel (2009), "Civil War," *Journal of Economic Literature*, forthcoming.

Caselli, F. and W. J. Coleman (2001), "The U.S. Structural Transformation and Regional Convergence: A Reinterpretation," *Journal of Political Economy* **109**, 584–616.

Caselli, F. and W. J. Coleman (2006), "On the Theory of Ethnic Conflict," mimeo., Department of Economics, London School of Economics.

Clark, C. (1940), *The Conditions of Economic Progress*, London: Macmillan.

Collier, P. and A. Hoeffler (1998), "On Economic Causes of Civil War," *Oxford Economic Papers* **50**, 563–573.

Collier, P. and A. Hoeffler (2004), "Greed and Grievance in Civil War," *Oxford Economic Papers* **56**, 563–595.

Dasgupta, P. (1993), *An Inquiry into Well-Being and Destitution*, Oxford: Clarendon Press.

Dube, O. and J. Vargas (2009), "Commodity Price Shocks and Civil Conflict: Evidence from Colombia," mimeo., Kennedy School of Government, Harvard University.

Duflo, E. (2006), "Poor But Rational?" In *Understanding Poverty* (eds. A. Banerjee, R. Bénabou and D. Mookherjee), New York: Oxford University Press.

Duflo, E. and R. Pande (2007), "Dams," *Quarterly Journal of Economics* **122**, 601–646.

Engerman, S. and K. Sokoloff (1997), "Factor Endowments, Institutions, and Differential Paths of Growth among New World Economies: A View from Economic Historians of the United States," in *How Latin America Fell Behind: Essays on the Economic Histories of Brazil and Mexico, 1800–1914* (ed. S. Haber), Stanford, CA: Stanford University Press.

Esteban, J. and D. Ray (1994), "On the Measurement of Polarization," *Econometrica* **62**, 819–51.

Esteban, J. and D. Ray (2006), "Inequality, Lobbying and Resource Allocation," *American Economic Review* **96**, 257–279.

Esteban, J. and D. Ray (2008), "On the Salience of Ethnic Conflict," *American Economic Review* **98**, 2185–2202.

Esteban, J. and D. Ray (2009), "A Model of Ethnic Conflict," *Journal of the European Economic Association*, forthcoming.

Fearon, J. (1995), "Rationalist Explanations for War," *International Organization* **49**, 379–414.

Fearon, J. and D. Laitin (2003), "Ethnicity, Insurgency, and Civil War," *American Political Science Review* **97**, 75–90.

Field, E. (2007), "Entitled to Work: Urban Property Rights and Labor Supply in Peru," *Quarterly Journal of Economics* **122**, 1561–1602.

Fields, G. (1980), "Poverty, Inequality and Development," London: Cambridge University Press.

Fieler, A-C. (2010), "Non-Homotheticity and Bilateral Trade: Evidence and a Quantitative Explanation," mimeo., Department of Economics, University of Pennsylvania.

Foellmi, R. and Josef Zweimüller (2006), "Income Distribution and Demand-Induced Innovations," *Review of Economic Studies* **73**,941–960.

Freeman, S. (1996), "Equilibrium Income Inequality among Identical Agents," *Journal of Political Economy* **104**, 1047–1064.

Galor, O. and J. Zeira (1993), "Income Distribution and Macroeconomics," *Review of Economic Studies* **60**, 35–52.

Genicot, G. and D. Ray (2009), "Mobility and Aspirations," mimeo., Department of Economics, Georgetown University.

Ghatak, M. and N. Jiang (2002), "A Simple Model of Inequality, Occupational Choice and Development," *Journal of Development Economics* **69**, 205–226.

Ghatak, M. and D. Mookherjee (2009), "Industrialization and Compensation for Displaced Farmers," mimeo, Boston University and London School of Economics.

Goldstein, M. and C. Udry (2008), "The Profits of Power: Land Rights and Agricultural Investment in Ghana," *Journal of Political Economy* **116**, 981-1022.

Gollin, D., Parente, S. and R. Rogerson (2007), "The Food Problem and the Evolution of International Income Levels, *Journal of Monetary Economics* **54**, 1230–1255.

Hirschman, A. (1958), *The Strategy of Economic Development*, New Haven, CT: Yale University Press.

Hirschman, A. and M. Rothschild (1973), "The Changing Tolerance for Income Inequality in the Course of Economic Development; with a Mathematical Appendix," *Quarterly Journal of Economics* **87**, 544–66.

Hoff, K., Braverman, A. and J. Stiglitz eds. (1993), *The Economics of Rural Organization: Theory, Practice and Policy*, London: Oxford University Press.

Horowitz, D. (1985), *Ethnic Groups in Conflict: Theories, Patterns, Policies*, Berkeley, CA: University of California Press.

Kongsamut, P., Xie, D. and S. Rebelo (2001), "Beyond Balanced Growth," *Review of Economic Studies* **68**, 869–882.

Kuznets, S. (1957), "Quantitative Aspects of the Economic Growth of Nations: II," *Economic Development and Cultural Change*, Supplement to Vol. 5, 3–111.

Lewis, W. A. (1954). "Economic Development with Unlimited Supplies of Labor," *The Manchester School of Economic and Social Studies* **22**, 139–191.

Ljungqvist, L. (1993), "Economic Underdevelopment: The Case of A Missing Market for Human Capital," *Journal of Development Economics* **40**, 219–239.

Loury, G. (1981), "Intergenerational Transfers and the Distribution of Earnings," *Econometrica* **49**, 843–867.

Lucas, R. (1990), "Why Doesn't Capital Flow from Rich to Poor Countries?" *American Economic Review* **80**, 92–96.

Majumdar, M. and T. Mitra (1982), "Intertemporal Allocation with a Non-Convex Technology: The Aggregative Framework," *Journal of Economic Theory* **27**, 101–136.

Mani, A. (2001), "Income Distribution and the Demand Constraint," *Journal of Economic Growth* **6**, 107–133.

Mankiw, N., Romer, D. and D. Weil (1992), "A Contribution to the Empirics of Economic Growth," *Quarterly Journal of Economics* **107**, 407–438.

Markusen, J. (1986), "Explaining the Volume of Trade: An Eclectic Approach," *American Economic Review* **76**,1002–1011.

Matsuyama, K. (2000), "A Ricardian Model with a Continuum of Goods under Nonhomothetic Preferences: Demand Complementarities, Income Distribution and North-South Trade," *Journal of Political Economy* **108**, 1093–1120.

Matsuyama, K. (2002), "The Rise of Mass Consumption Societies," *Journal of Political Economy* **110**, 1035–1070.

Miguel, E., Satyanath, S. and E. Sergenti (2004), "Economic Shocks and Civil Conflict: An Instrumental Variables Approach," *Journal of Political Economy* **112**, 725–753.

Mitra, A. and D. Ray (2010), "Implications of an Economic Theory of Conflict: Hindu-Muslim Violence in India," mimeo., Department of Economics, New York University.

Montalvo, J. and M. Reynal-Querol (2005), "Ethnic Polarization, Potential Conflict, and Civil Wars," *American Economic Review* **95**, 796–813.

Mookherjee, D. and D. Ray (2001) *Readings in the Theory of Economic Development*, London: Basil Blackwell.

Mookherjee, D. and D. Ray (2002), "Is Equality Stable?" *American Economic Review* **92**, 253–259.

Mookherjee, D. and D. Ray (2003), "Persistent Inequality," *Review of Economic Studies* **70**, 369–394.

Munshi, K. and M. Rosenzweig (2006), "Traditional Institutions Meet the Modern World: Caste, Gender, and Schooling Choice in a Globalizing Economy," *American Economic Review* **96**, 1225–1252.

Nurkse, R. (1953) *Problems of Capital Formation in Underdeveloped Countries*, New York: Oxford University Press.

Parente, S. and E. Prescott (2000), *Barriers to Riches*, Cambridge, MA: MIT Press.

Ranis, G., and J. Fei (1961). "A Theory of Economic Development," *American Economic Review* **51**, 533–565.

Rao, V. K. R. V. (1952). "Investment, Income and the Multiplier in an Underdeveloped Economy," reprinted in A. N. Agarwala and S. P. Singh (eds.). *The Economics of Underdevelopment*, Bombay: Oxford University Press, 1958.

Ray, D. (1998), *Development Economics*, Princeton, NJ: Princeton University Press.

Ray, D. (2006), "Aspirations, Poverty and Economic Change, in A. Banerjee, R. Bénabou and D. Mookherjee (eds), *What Have We Learnt About Poverty?*, New York, NY: Oxford University Press.

Ray, D. (2007), "Development Economics," in the *New Palgrave Dictionary of Economics*, edited by Lawrence Blume and Steven Durlauf.

Ray, D. (2008), *A Game-Theoretic Perspective on Coalition Formation*, New York: Oxford University Press.

Robinson, J. (2001), "Social Identity, Inequality and Conflict, *Economics of Governance* **2**, 85–99.

Rosenstein-Rodan, P. (1943), "Problems of Industrialization of Eastern and Southeastern Europe," *Economic Journal* **53**, 202–211.

Sen, A. (1999), *Development as Freedom*, New York: Alfred A. Knopf.

Sokoloff, K. and S. Engerman (2000), "History Lessons: Institutions, Factor Endowments, and Paths of Development in the New World," *Journal of Economic Perspectives* **14**, 217–232.

Solow, R. (1956), "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics* **70**, 65–94.

Stiglitz, J. (2002), *Globalization and its Discontents*, W.W. Norton.

Wang, S-Y. (2008), "Credit Constraints, Job Mobility and Entrepreneurship: Evidence from a Property Reform in China, NYU Development Research Institute Working Paper No. 30.